Target monitoring with long. segmented detectors

polar. mtg.
06.03.13

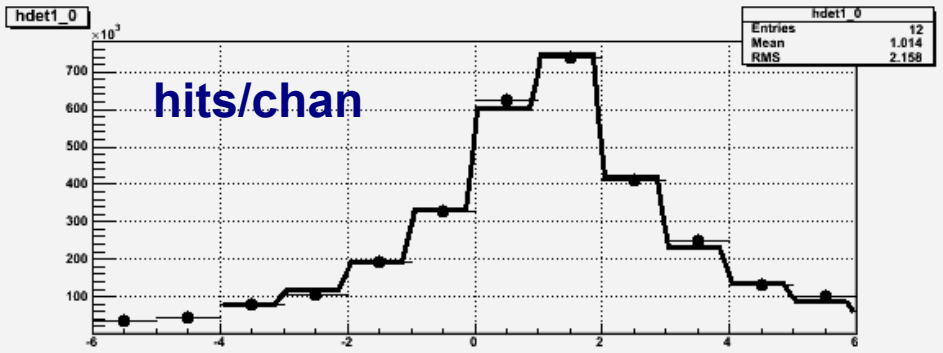
- Have good measurements 30/48 targets, 1st look
- Fits to long. detectors ⇒ target looseness: 'sway'
- Examples: taut, medium loose, very loose targets
- Summary: 30/48 targets with sway measure
- Target sway change inj.→store?
- Details of targets breaking

Det. dist. fits

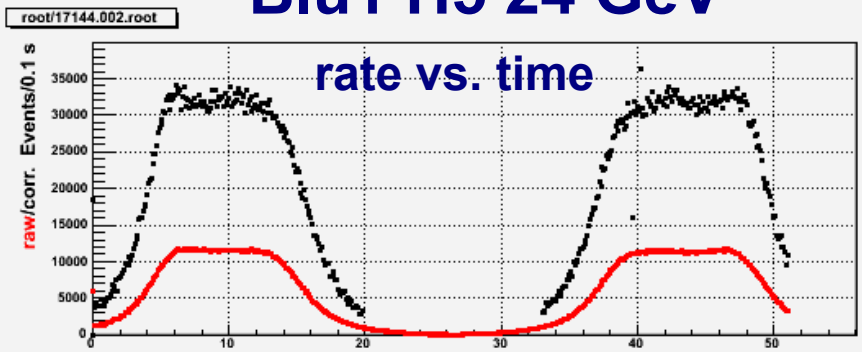
- Fits to det. distribution:
  z0: target position along beam
  Lmax: thickness target→det.
- Do fits in 0.1 sec. bins

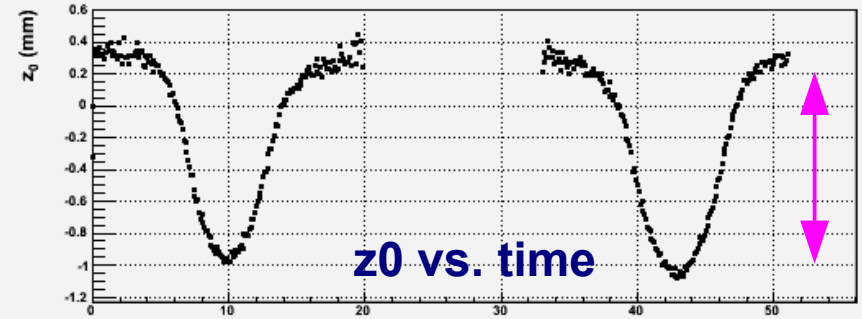
- Define 'sway' of target:
  width of z0 window with 70% events
  (avoid wild fits, z0 values)
- Just rough measure of looseness;
  sway always > 0.1-0.2 mm stat. noise
- Here: sway = 1.2 mm (very loose)

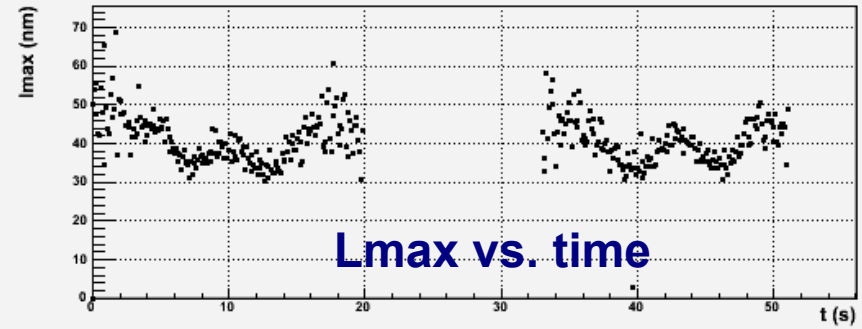
- A few more examples ↘

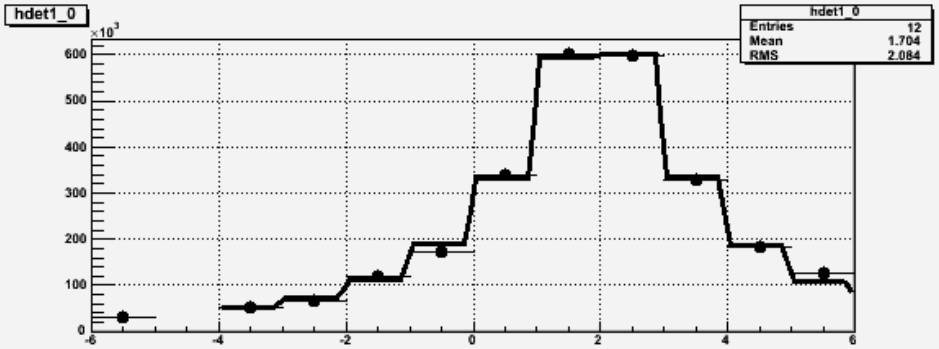


Blu1 H5 24 GeV

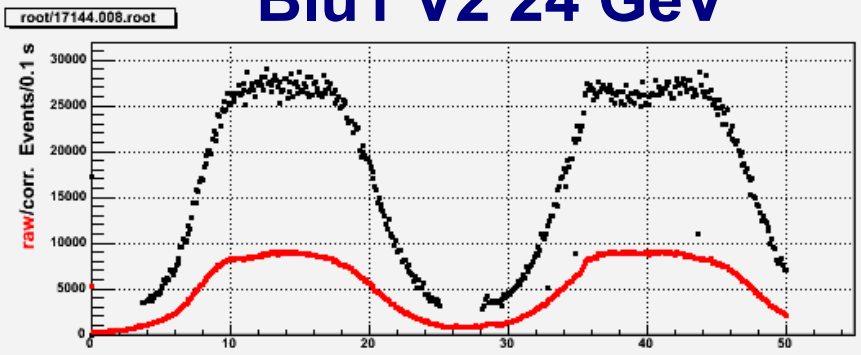




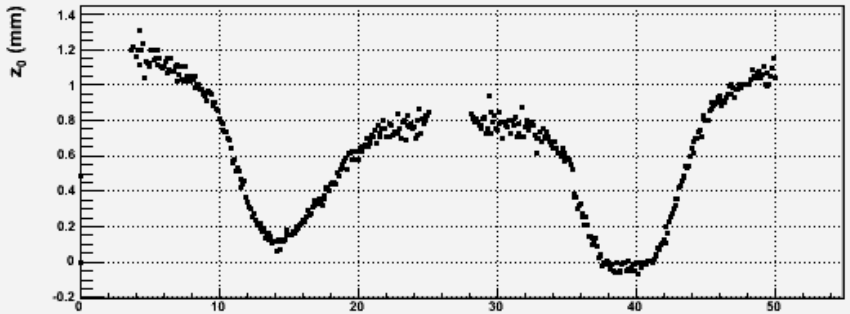


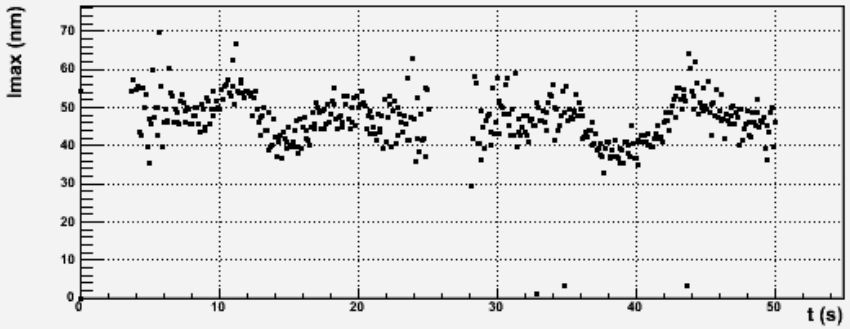


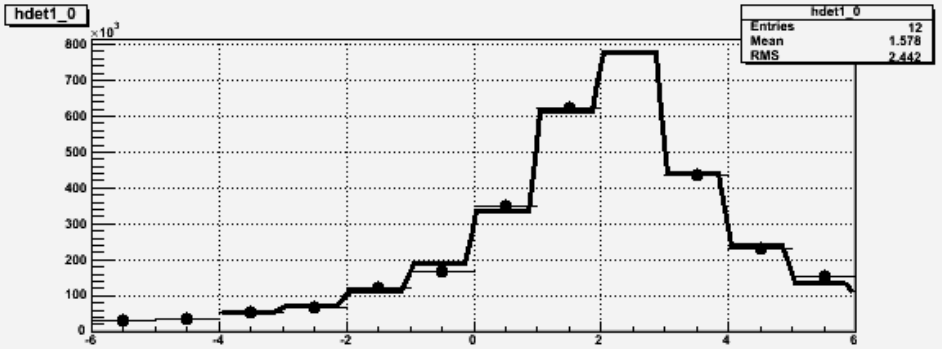
Blu1 V2 24 GeV



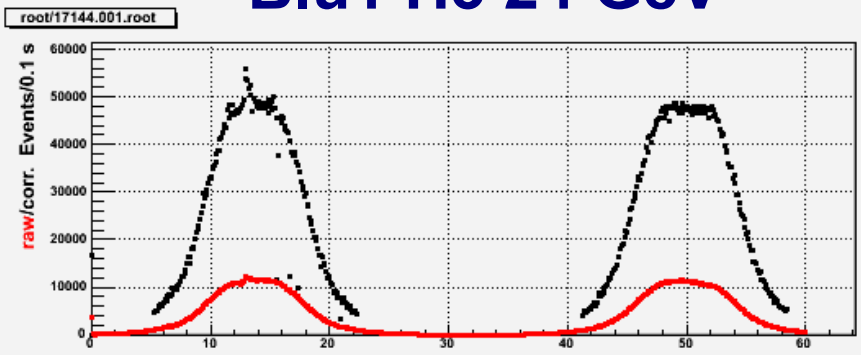
sway = 0.9 mm, loose



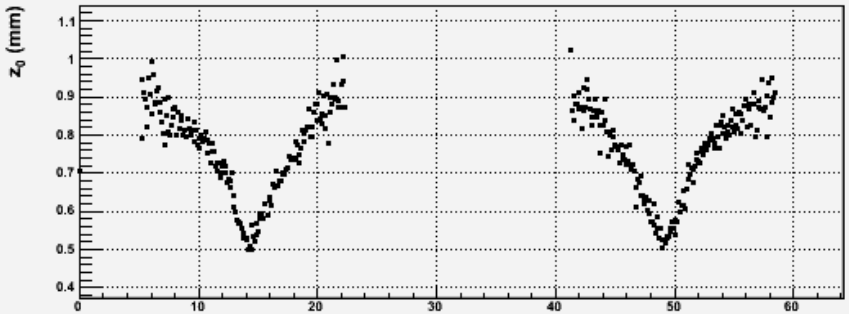


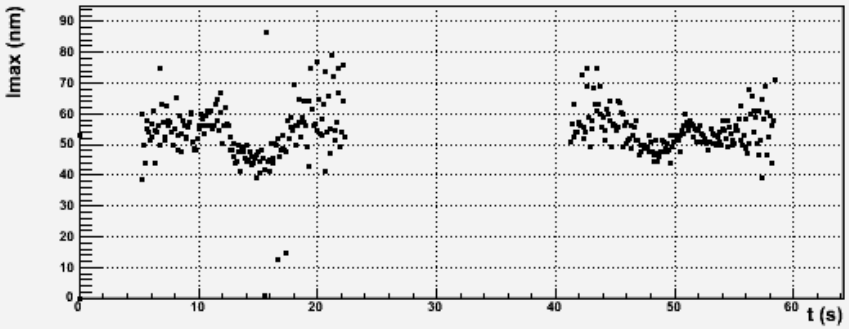


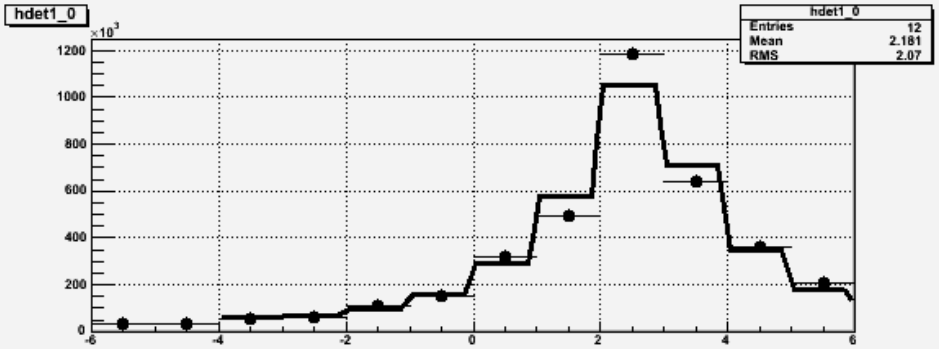
Blu1 H3 24 GeV



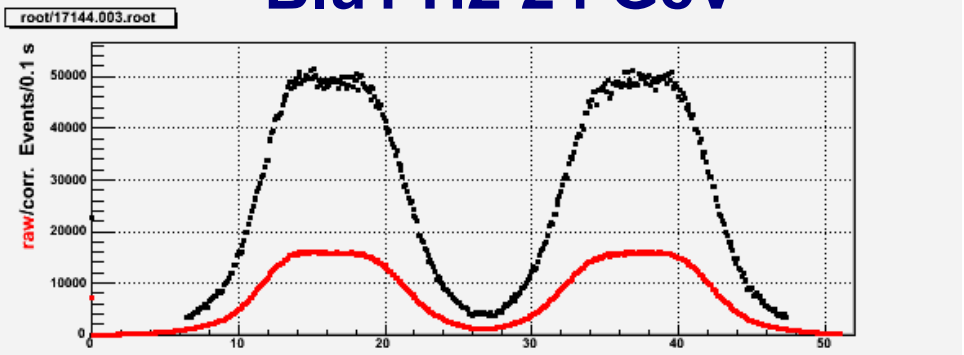
sway = 0.3 mm, medium



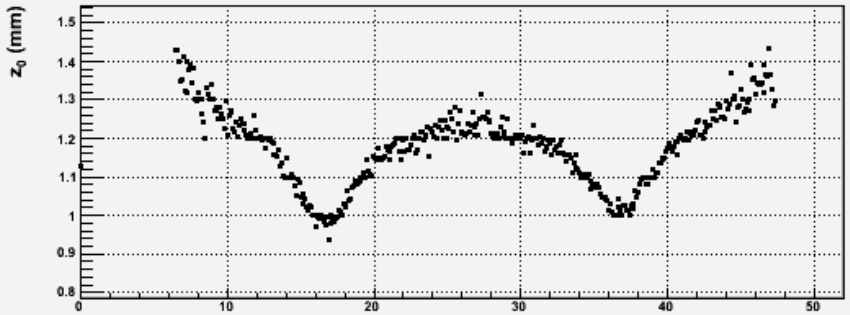


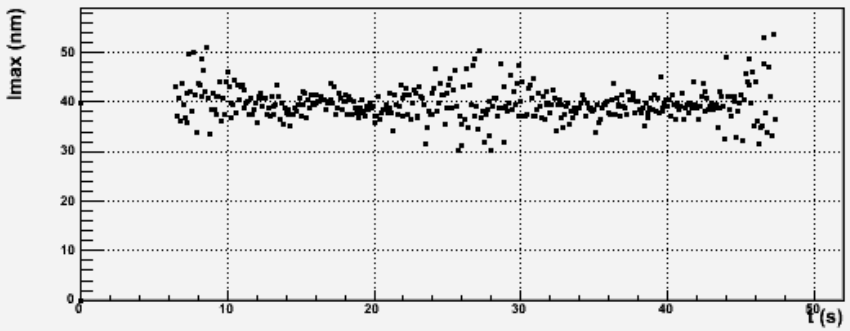


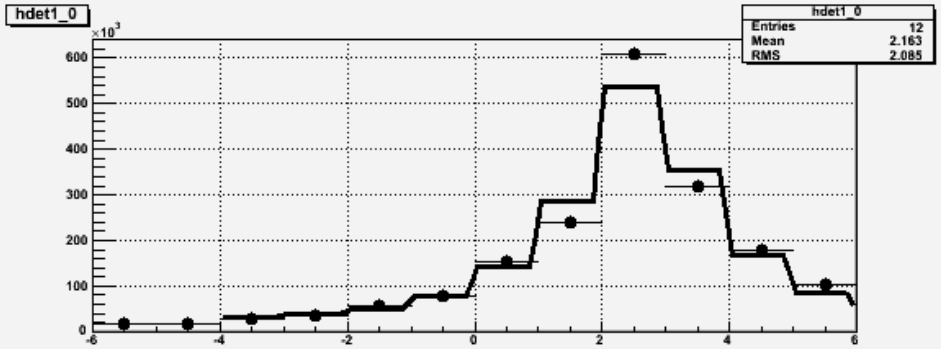
Blu1 H2 24 GeV



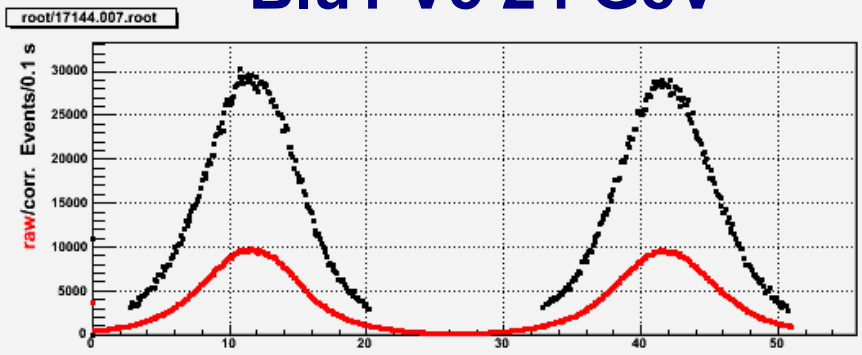
sway = 0.2 mm, medium



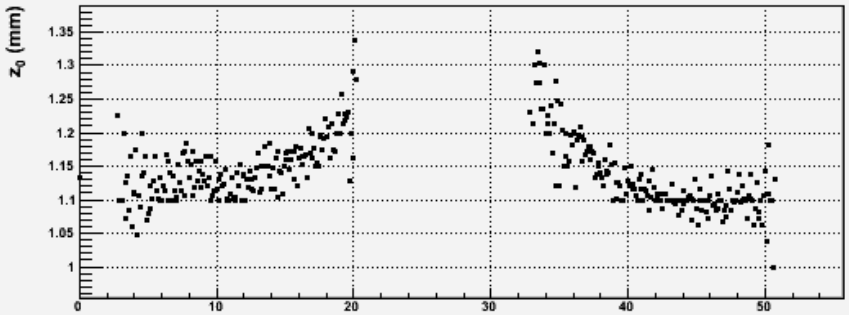




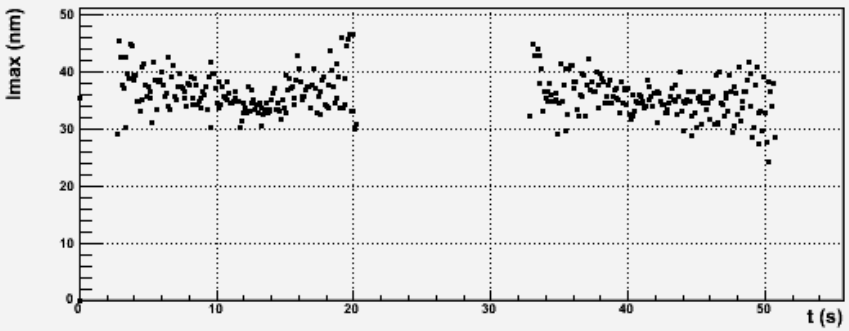
Blu1 V5 24 GeV



sway = 0.1 mm, taut

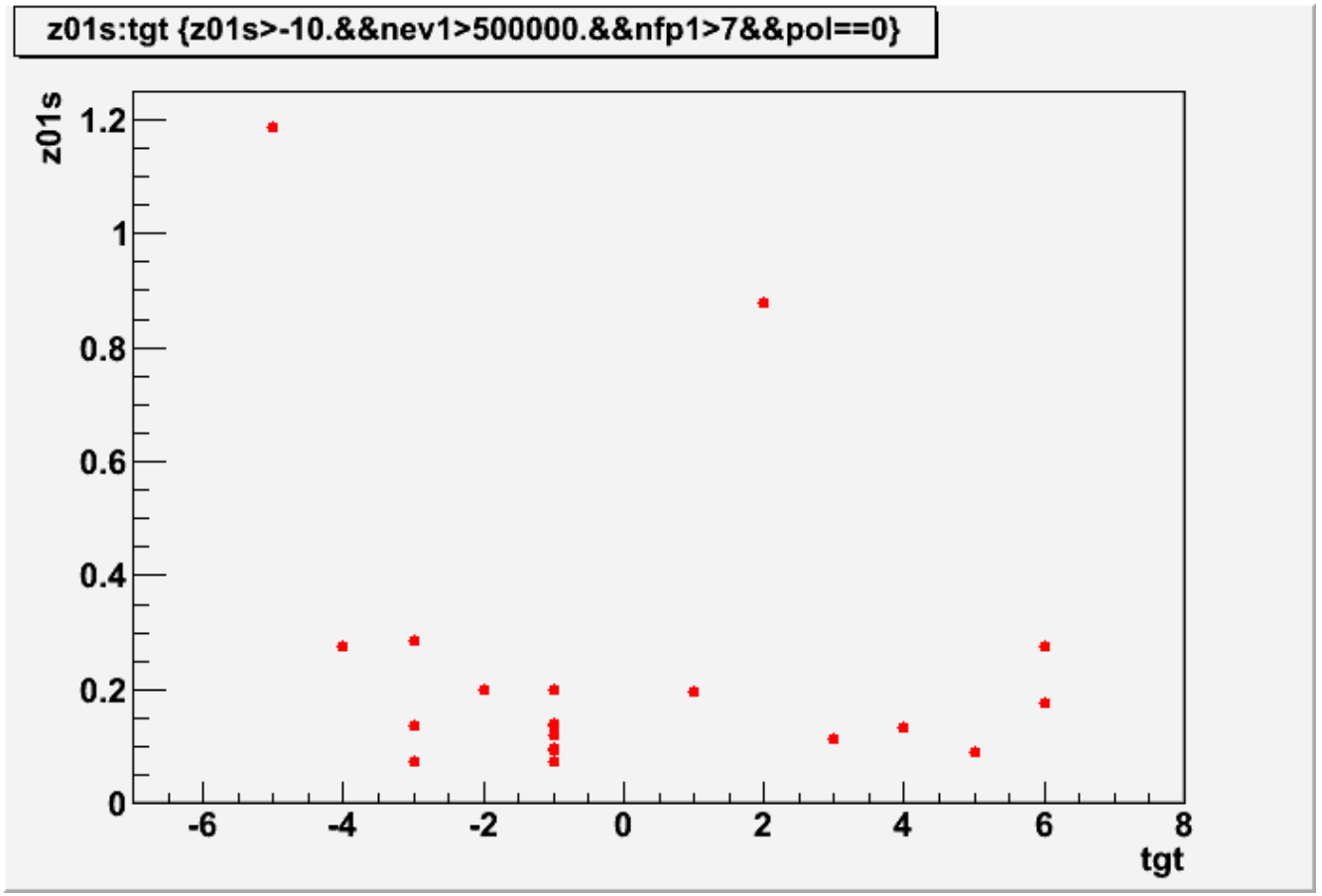


many look like this



Blu1 sway vs. target

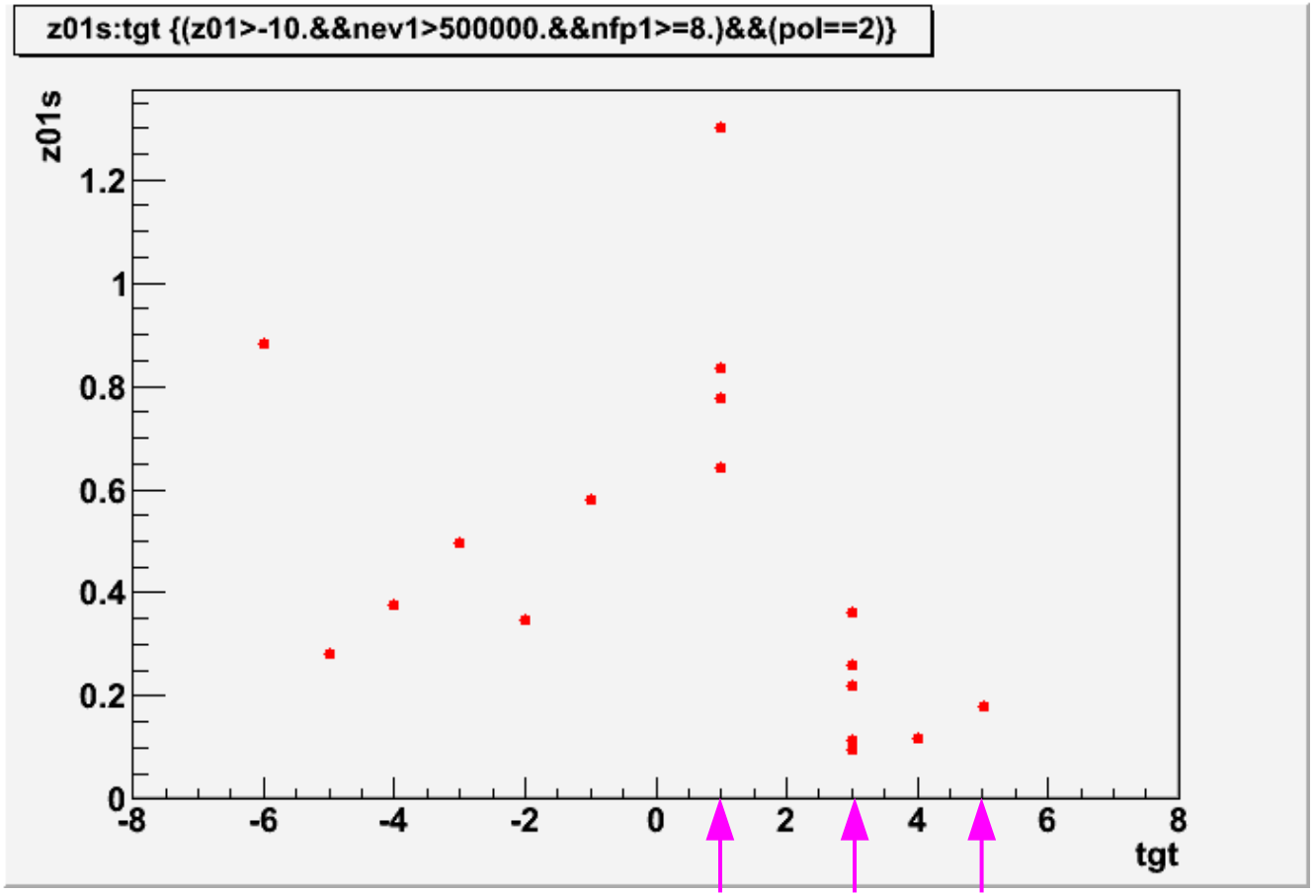
tgt<0 H
tgt>0 V



- V3, V4, V5 taut
- H4, H3, H2, H1, V1, V6 medium→loose
- H5, V2 very loose

Blu2 sway vs. target

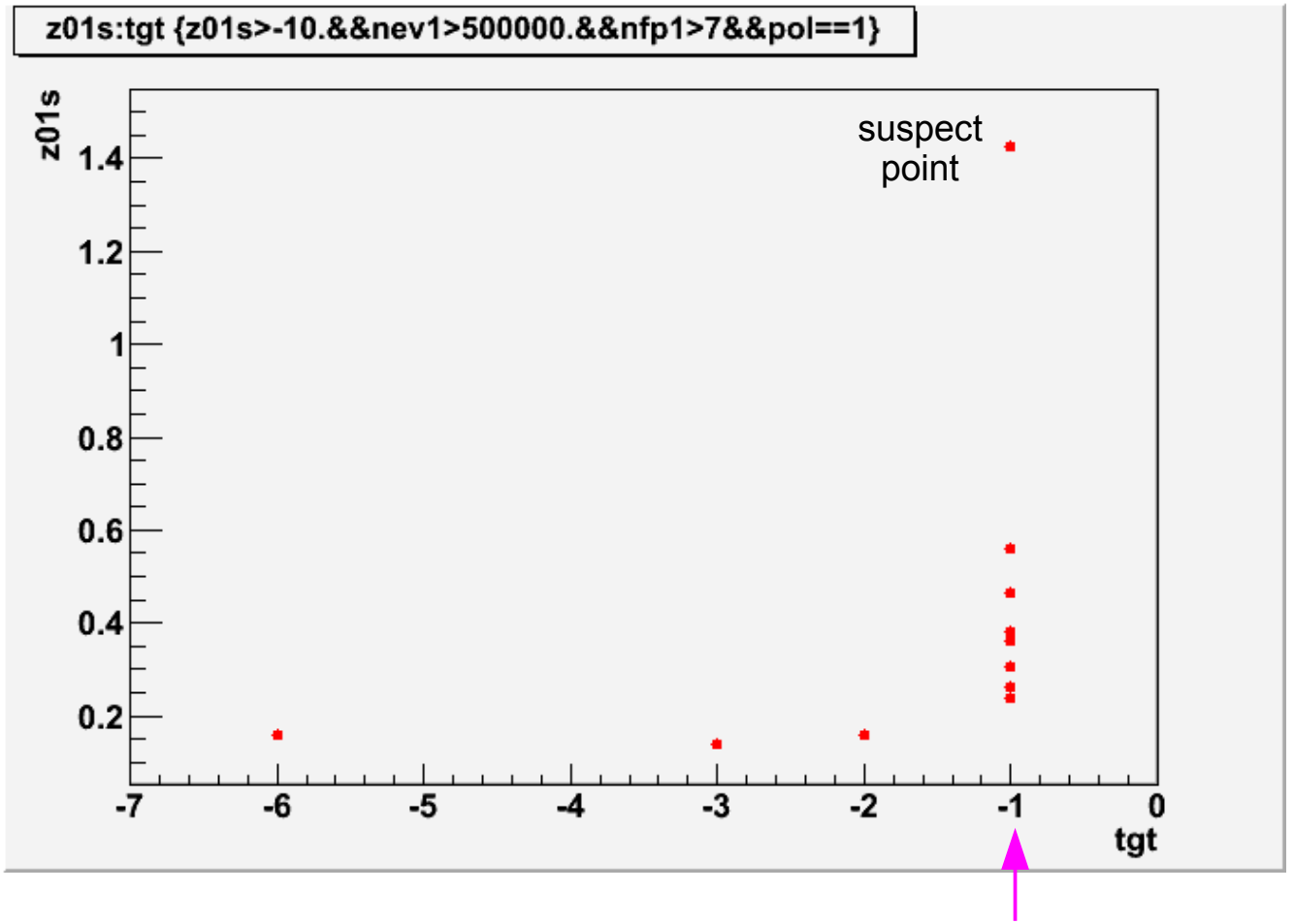
tgt<0 H
tgt>0 V



- V4, V5 taut
- V3, H1, H2, H3, H4, H5 medium→loose
- H6, V1 very loose
- V1, V3, V5 have broken already

Yel1 sway vs. target

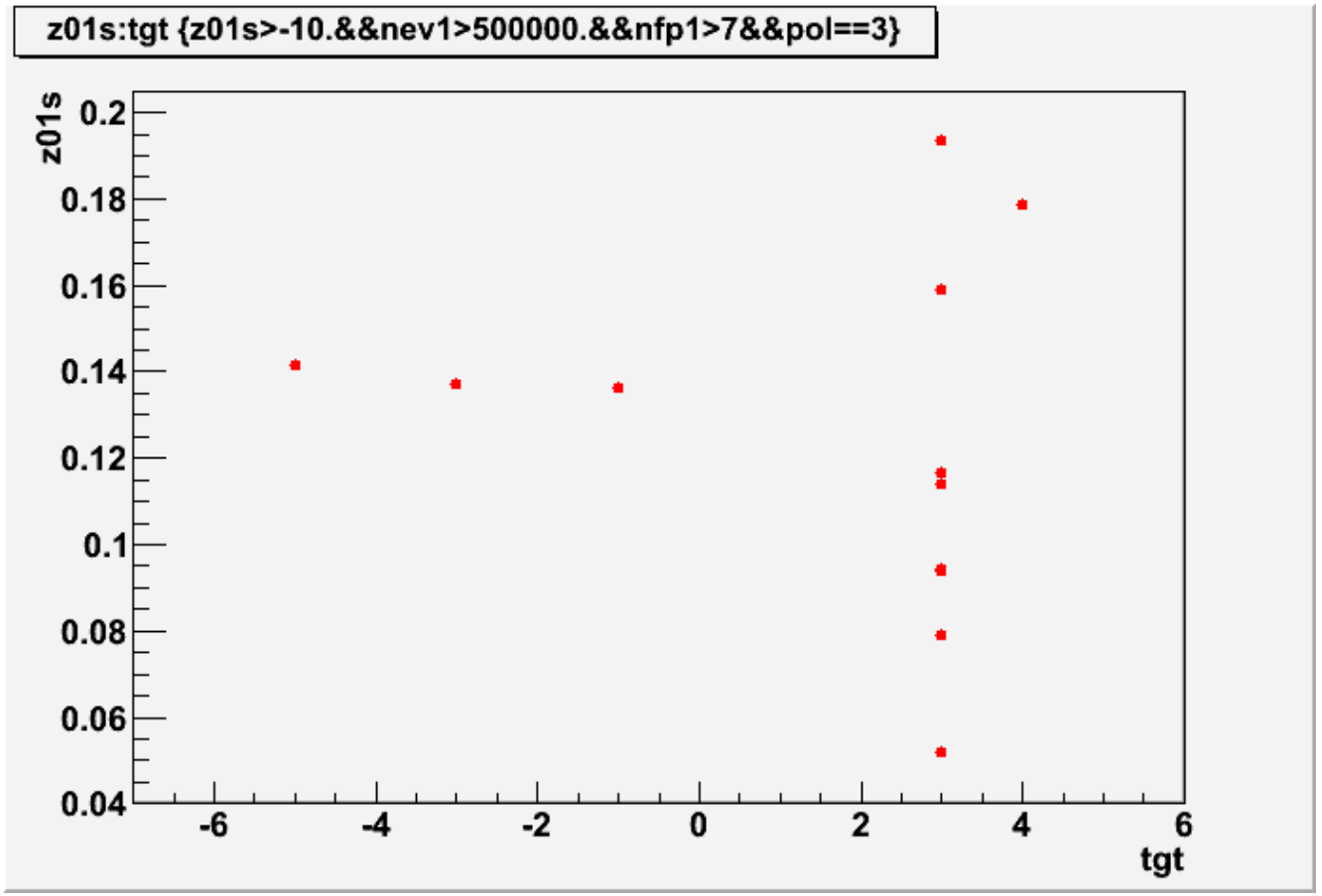
tgt<0 H
tgt>0 V



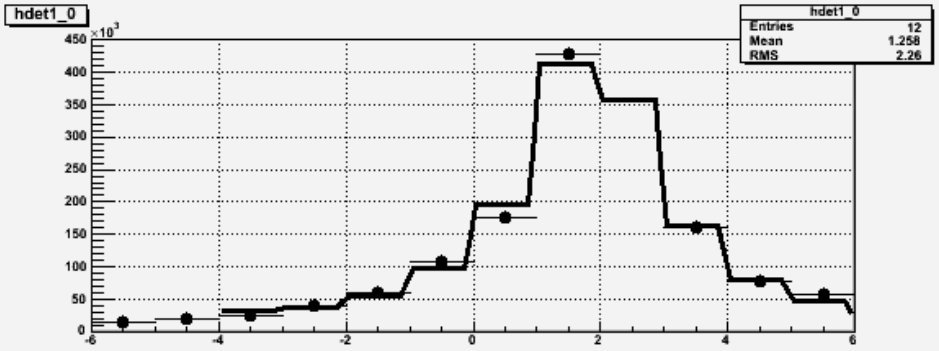
- H6, H3, H2 taut
- H1 medium→loose
- H1 broken already

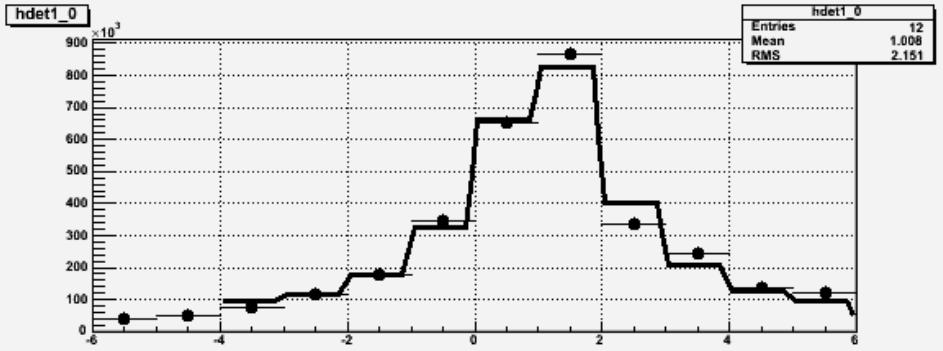
Yel2 sway vs. target

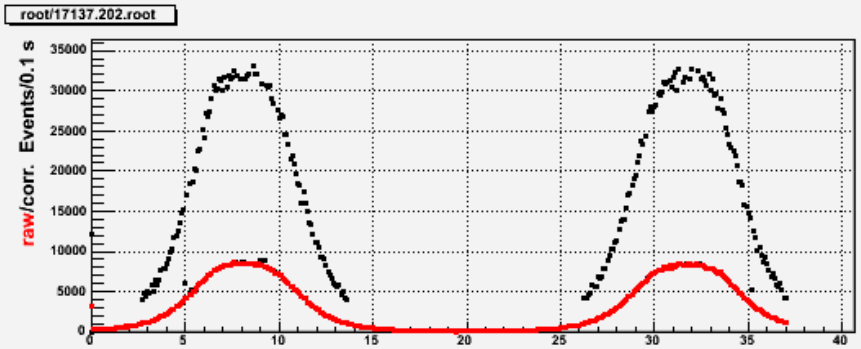
tgt<0 H
tgt>0 V



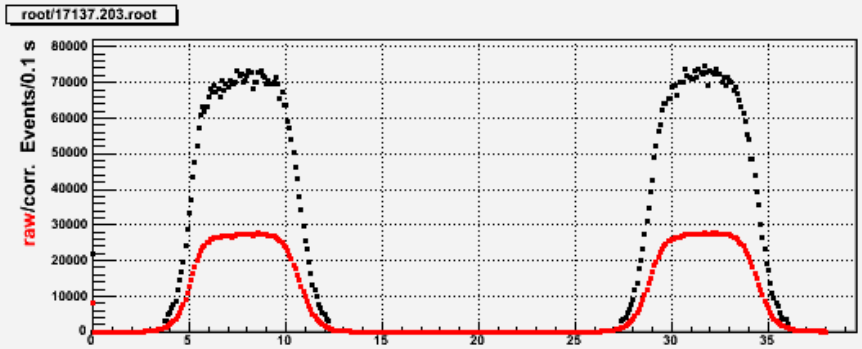
- H5, H3, H1, V3, V4 all taut



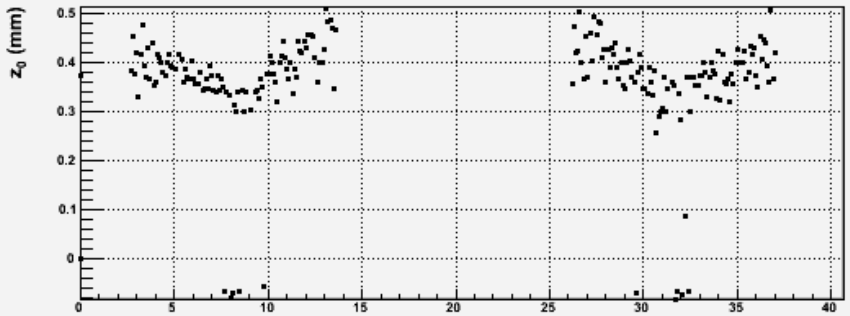




sway = 0.1 mm



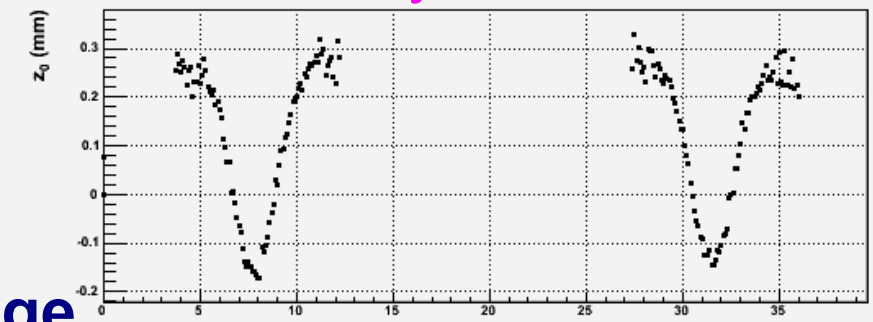
sway = 0.36 mm



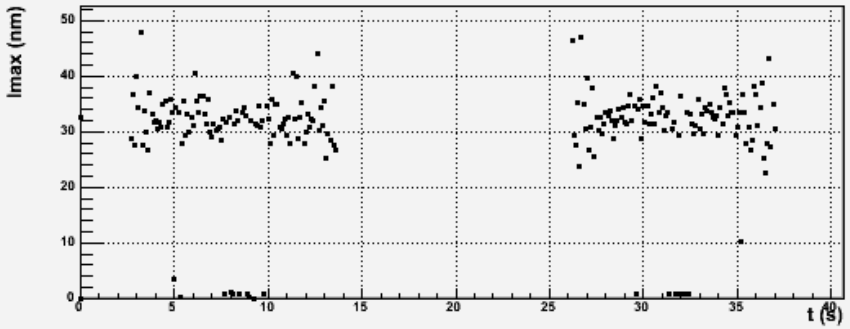
24 GeV 3:00 AM

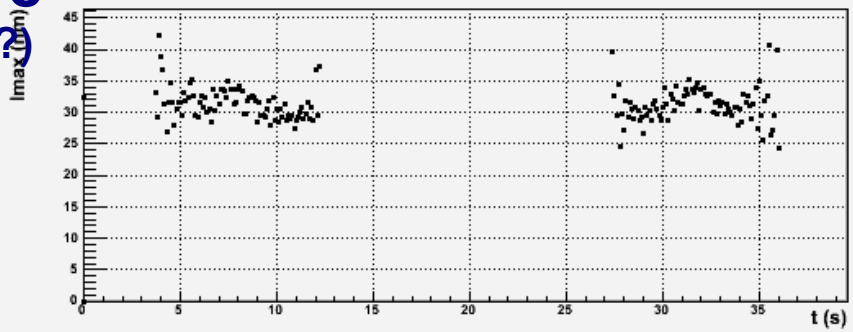
Blu2
V3

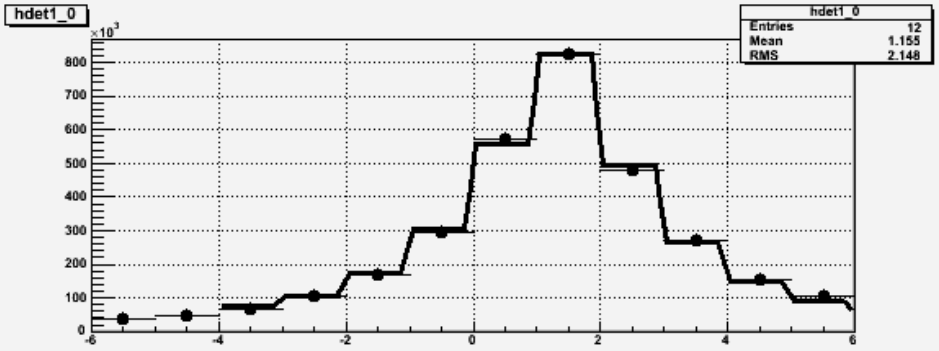
big change
inj.→store
(same target?)

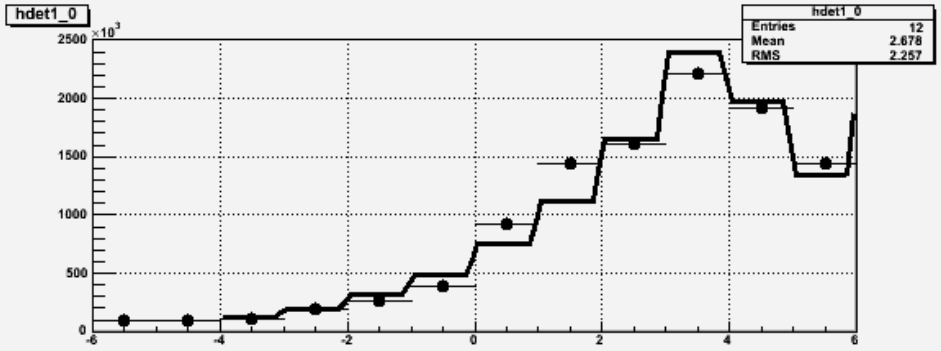


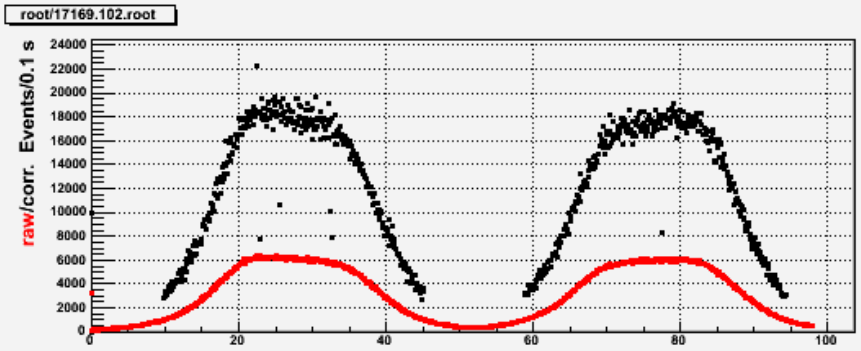
255 GeV 3:00 AM



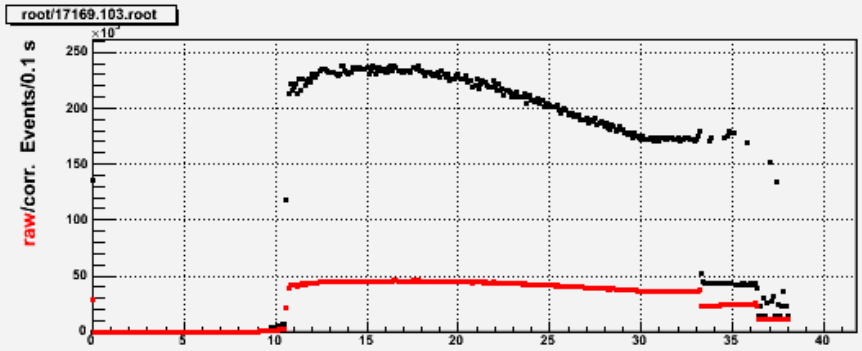




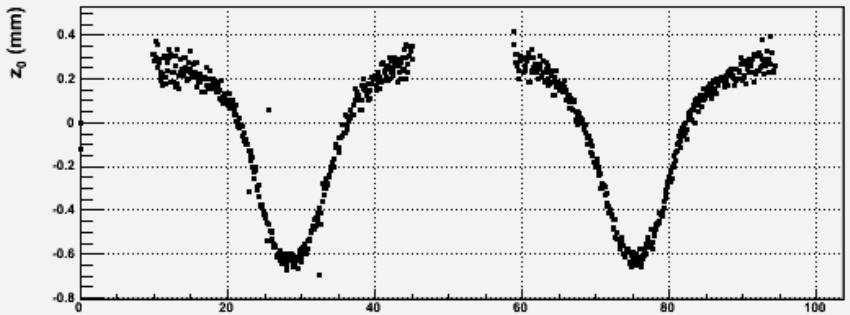




sway = 0.76 mm



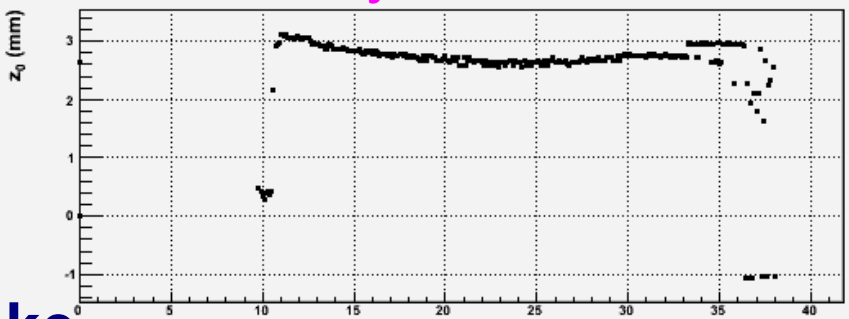
'sway' = 0.35 mm



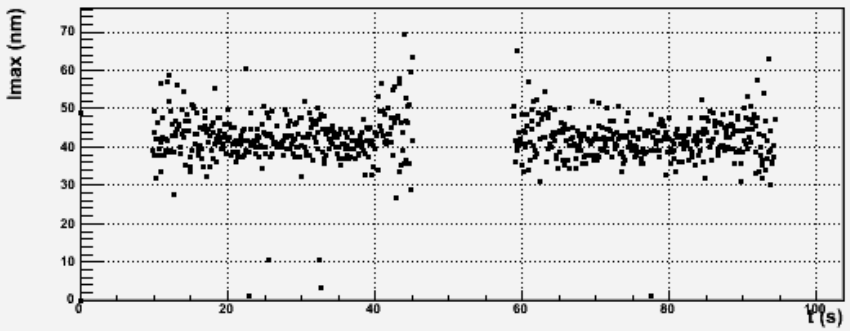
24 GeV 4:00 AM

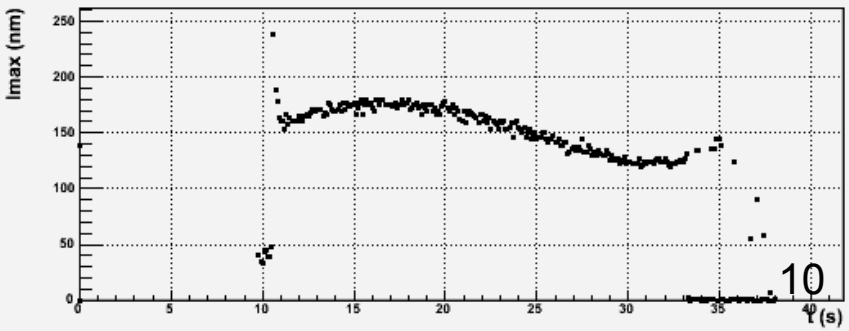
Yel1
H1

target broke here:



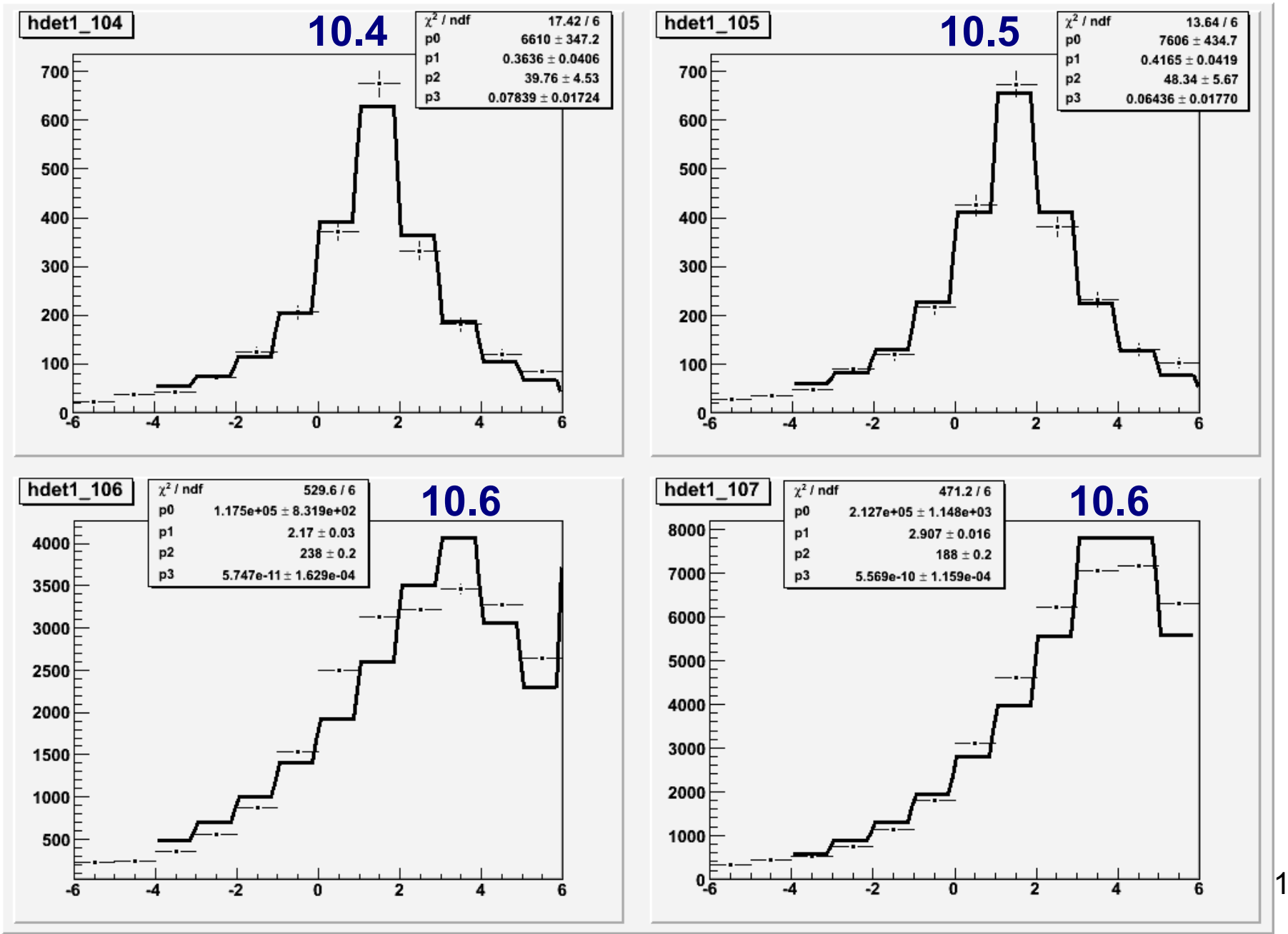
255 GeV 4:20 AM



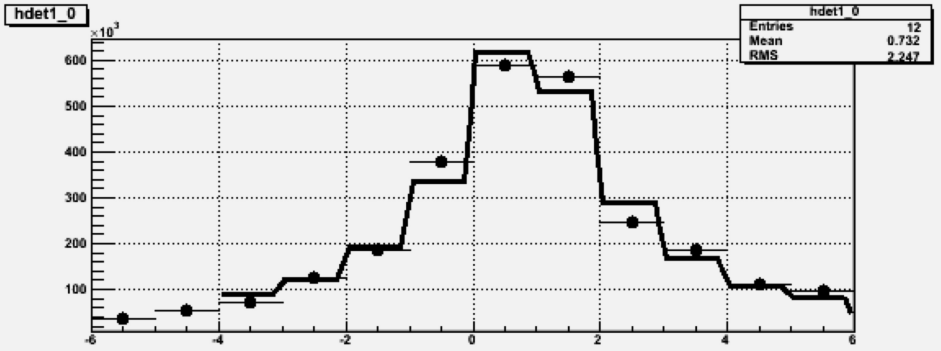


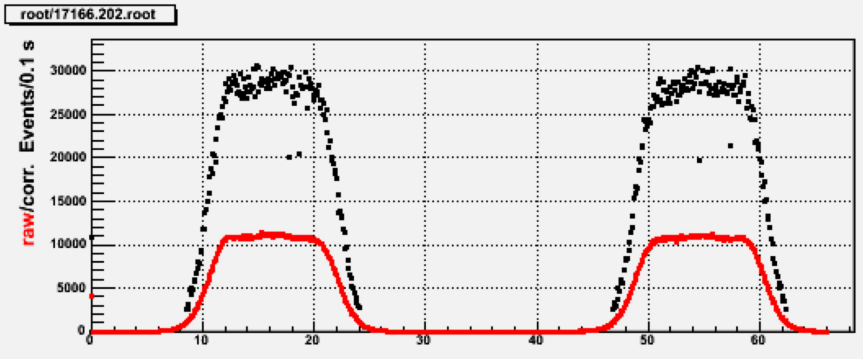
Y1 tgt. H1 breaking

- Target broke 10.5-10.6 seconds into measurement:

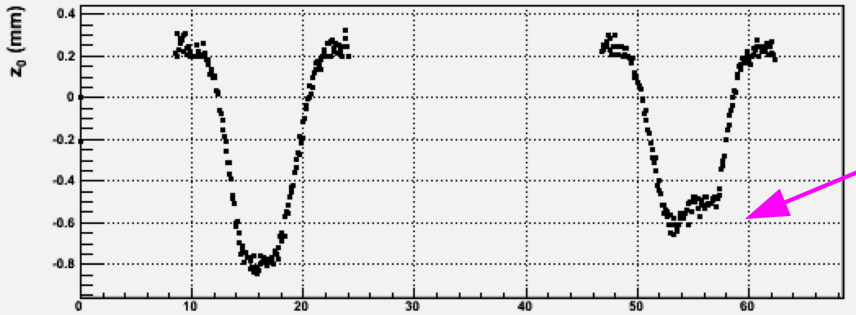


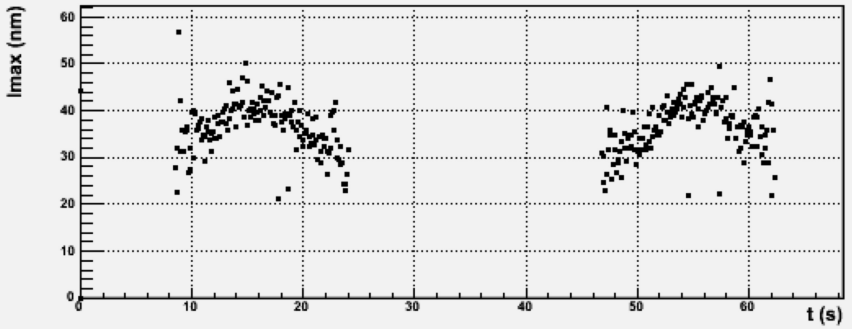
Last gasp: B2 V3





sway = 0.83 mm





- Target was gone after this measurement
- Something here?

Summary

- Long. segmented detectors useful for target monitoring
- Looseness ('sway'): track with time; indicative of mortality?
- Quick evidence of target breaking
- Things we don't know yet: “Unknown unknowns”

<u>Wish to improve:</u>

- Det. distribution fits hampered by disabled channels: Loosen cuts per channel on calib. fit:
  - χ^2/NDOF cut just eliminating chans. with most events should eliminate or make much looser
- Add fits, summary plots to fast offline analysis, web page